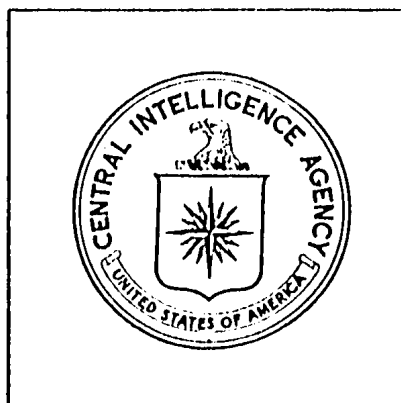


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*The Tan-Zam Railroad: Progress and
Potentials of the Vehicle of Smoke*

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Central Intelligence Agency
Directorate of Intelligence
June 1973

THE TAN-ZAM RAILROAD: PROGRESS AND POTENTIALS
OF THE VEHICLE OF SMOKE*

SUMMARY

1. Construction of the Chinese-financed Tan-Zam Railroad, now far ahead of schedule, may well be completed by the end of 1974. The most difficult sections have been finished, and the remainder presents few major construction difficulties. Planned annual traffic capacity of 3.5 million tons is feasible if the port of Dar es Salaam can successfully be enlarged or supplemented by other ports.
2. There is a possibility that the already completed eastern part of the Tan-Zam can be used in conjunction with truck transport to export Zambian copper formerly shipped through Rhodesia. It is doubtful if the line can yet handle heavy axle loads or if the congested harbor at Dar es Salaam could handle the increased traffic.
3. Completion of the Tan-Zam is expected to facilitate the development of both agriculture and mineral resources in Tanzania and Zambia. Preliminary steps have already been taken to carry out development plans, and the railroad construction work itself has contributed significantly to economic growth in formerly remote areas.

*The literal translation of the Swahili word for railroad, gari la moshi.



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4. Problems in administering the generous Chinese loan have arisen principally from the difficulty of selling Chinese consumer goods in Tanzania to defray local construction costs. Among the adverse effects has been a worsening of relations with Kenya, whose goods have been replaced, at a time when the Tan-Zam promises to make Tanzanian membership in the East African Community more feasible.

Introduction

5. The Tan-Zam Railroad when completed will connect the deep-water port of Dar es Salaam, Tanzania, with Zambia's landlocked copperbelt, the source of approximately 20 percent of the non-Communist world's copper. The project, financed by the People's Republic of China (PRC), is the largest single aid project in sub-Saharan Africa. The estimated cost is reported to be \$400 million, which the Chinese have agreed to lend to Tanzania and Zambia on such generous terms that the loan capital is virtually a gift. Although originally scheduled for completion in late 1975 or 1976, work on the railroad is already a year ahead of schedule and may be finished in 1974.

6. Politics more than economics have dictated the building of the line. For Zambia the railroad will mean a reduced dependence on white-ruled southern Africa for handling its export and import requirements and closer ties with the East African Community (EAC), a regional organization comprising Tanzania, Kenya, and Uganda. Zambia adopted a more northward-looking policy when Rhodesia declared her independence in 1965 and then officially terminated all trade with or through Rhodesia in January of this year when Salisbury temporarily closed her borders in protest against incursions by Zambia-based guerrillas. Zambia hopes that the Tan-Zam will allow her eventually to break almost completely with the south. For both Zambia and Tanzania the railroad could have long-term economic benefits, possibly opening up several promising areas to development.

7. Tanzania and Zambia had sought assistance from the West as early as 1964 for construction of the railroad. Tanzania took the initiative in seeking Communist aid only after the International Bank for Reconstruction and Development (IBRD), the United States, Great Britain, and Canada each found the project economically unsound. By committing herself to financing the railroad the PRC entered the front rank of foreign aid donors to Africa and became the largest donor in both Tanzania and Zambia.

Progress

8. Construction of the 571-mile Tanzanian portion of the railroad is well ahead of schedule with over 430 miles from the port of Dar es Salaam to Rujewa completed. The

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first section, from Dar es Salaam to Mlimba, in the Kilombero Valley, was completed in November 1971. Construction of the most difficult section, which threads its way more than 4,000 feet up the Lumuwe-Kitete and Makumbako Escarpments to Makumbako, was completed in December 1972. (Fig. 1) This section -- although only 8 percent of the total, 94 miles -- required the heaviest engineering work to overcome the difficult features of rock, unstable soils, swamps, and steep gradients. Nearly 20 million cubic meters of earth was excavated, and construction of 18 tunnels and 48 bridges was necessary. (Fig. 2) Tracklaying in the final section in Tanzania as of 30 March 1973 had reached a point within 80 miles of Mbeya. The roadbed ahead of the tracklaying team is being prepared by an advance construction team that is rapidly completing most of the bridging and excavation work.

9. Preliminary work on the 584-mile roadbed in Zambia, which began in October 1971, is completed. Tracklaying on the 120-mile link between Kasama and Mpika began when the rainy season ended in April 1973. Most of the labor force has been transferred to this section, and three main Chinese-led construction teams are now in Zambia. Construction camps have been set up between the Tanzanian border and Kasama in anticipation of tracklaying teams, which should be well into Zambia by the end of the year. As of 30 March 1973 there was no evidence of any further work being done on the final section from Mpika to Kapiri Mposhi.

10. Major repair facilities including rolling stock workshops are now under construction in Dar es Salaam and Mpika. General purpose yards are also being built at several key points along the line. Major stations are planned for Dar es Salaam, Mlimba, Makumbako, Mbeya, Nteko, and Kapiri Mposhi, where the Tan-Zam will join the existing Zambian line.

Capacity

11. Initial traffic capacity is planned to be 2 million tons per annum with 9 trains each way daily, later rising to 3.5 million tons with an average of 17 pairs of trains each day. These tonnages are, however, dependent on planned increases in port capacity: as of 30 March 1973 six of Dar es Salaam's berths were operational, an additional two had been completed but lacked cargo-handling facilities, and three more

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Figure 1

Some of the rugged terrain encountered by the Tan-Zam railroad near the Makumbako escarpment.



Figure 2

One of the 48 bridges in the difficult Mlimba-Makumbako section.

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were under construction. Completion was originally set for 1976, but with the step-up in construction activity following the closing of the Rhodesian-Zambian border, it could coincide with the completion of the railroad in late 1974. However, even these additional facilities would not enable the port to handle the traffic envisaged when the railroad is fully operational. Dar es Salaam is presently handling 2 million tons annually, but only by operating 24 hours a day. Tanzania recognizes the problem and has plans for further increasing the size of the port. However, this will necessitate widening and dredging the relatively narrow harbor channel, and some experts believe this will be too costly. (Fig. 3) There has been some discussion of constructing a new port ten miles to the south.

Present Use of the Tan-Zam

12. Zambia's January 1973 decision not to export her copper through Rhodesia has raised the question of possible use of the completed Tanzanian section of the railroad in conjunction with the Tan-Zam Highway. In the past some 27,000 tons of Zambia's monthly 56,000 tons of copper has been carried via Rhodesian Railways, and the rest has exited by road through Tanzania and by rail through Angola, 16,000 and 13,000 tons respectively. Zam-Tan Road Services (ZTRS) reportedly has access to 1,000 trucks and claims that with the Tan-Zam Railroad it could handle all the copper diverted from Rhodesia.

13. Passenger trains are reportedly running from Dar es Salaam to within 100 miles of the Zambian border, and freights have been carrying construction equipment to the railhead since construction began. However, there is some doubt as to whether or not the railroad is operational for heavy copper traffic. As of 1 March 1973 stabilizing and ballasting of the railbed were reported to be incomplete. There is also no evidence that Makumbako, the logical transshipment point for the copper, has the facilities for transferring the ingots from trucks to railcars nor that there is enough rolling stock available to carry the projected tonnages. Even if these problems could be worked out, the cargo-handling facilities at Dar es Salaam are so overloaded with the transit of material for the railroad that any further increase in traffic could cause major congestion.

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Figure 3

The port of Dar es Salaam. Its narrow harbor entrance restricts the size of ships it can accomodate.



Figure 4

Subsistence farming in the dry Northern Province of Zambia near the line of the railroad.

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Development in Zambia

14. For Zambia, the Tan-Zam holds prospects for opening up several new agricultural regions. Since the country has to import foodstuffs to feed her population, the Zambian Government has given agricultural development a high priority, and the routing of the railroad near several potentially rich agricultural areas in the north has provided the impetus for a program aimed at self-sufficiency by the mid-1970's. However, past programs have fallen short of expectations and the goals of the Second National Development Plan (SNDP), launched in 1972, are high. Any major step toward achieving them will be notable.

15. The areas surrounding both Mpika and Kasama in Northern Province have been designated Intensive Development Zones (IDZ's), areas of high agricultural potential in which government resources will be concentrated on small-scale, labor-intensive family farming supported by market and service cooperatives. Mpika, centrally located in the province, has a good potential for coffee, corn, and millets; and dairy farming looks especially promising for Kasama. Both areas have been earmarked for state tractor units, and a state-run dairy industry is being established at Kasama. Although not included in the IDZ's, the area around Iscka, in the extreme northeast, is considered suitable for cattle ranching, and along the southern section of the line near Mkushi the prospects for mixed farming are good.

16. The exploitation of substantial copper and manganese deposits near Mkushi may be made economically feasible by the proximity of the Tan-Zam. These deposits have remained untapped because of the expense of building a feeder line from the main Zambian railroad.

17. Zambia hopes the Tan-Zam will form an axis for development, with IDZ's acting as growth poles. Significant shifts in population toward these areas are expected in the near future. The traditional mode of slash-and-burn agriculture known as chitemene could give way eventually to a more permanent type of production with emphasis on cash cropping. (Fig. 4) Already farmers and fishermen in areas near the railroad construction camps are benefiting from sales of their surplus foodstuffs to workers. Particularly large numbers of people are expected to agglomerate around Kasama and Mpika, where planned development should create a variety of employment opportunities.

Development in Tanzania

18. Viewed as a catalyst for development, the Tan-Zam has an even greater potential for Tanzania than for Zambia. The Tanzanian Government has set up a number of collective projects and key stations along the route based on ujamaa villages, cooperative "self-supporting" settlements somewhat analogous to the Israeli kibbutzim. The Government hopes that the railroad, together with these nodes, will stimulate growth in several promising areas near the route.

19. Agricultural experts are particularly optimistic about prospects for the Kilombero Valley, which has remained relatively undeveloped because of poor accessibility. Beginning about 150 miles from Dar es Salaam, it is an area of fertile, well-watered soils. Small-holder farmers are being encouraged to grow cotton, rice, peanuts, and corn for the market. A government-financed sugar plantation and refinery complex has been established, and several other large-scale projects are in the planning stages.

20. In the Southern Highlands the route passes through the agriculturally rich areas of Njombe, Mbeya, and Rungwe Districts. The rugged terrain in these districts, rising up to 9,000 feet, catches the moisture-laden southeast monsoon between October and April. Rich volcanic loam and sedimentary soils coupled with the abundant precipitation make this area particularly promising for agricultural development. Subsistence producers already grow a wide variety of crops including potatoes, corn, millets, beans, peas, and rice; and pilot cash-cropping projects have recently been established in several areas in anticipation of railroad completion. Coffee, pyrethrum, tobacco, tea, and wattle are the major market crops, and local factories process the latter two. Prospects for wheat farming and sheep and cattle ranching are especially promising; local farmers are presently being encouraged to grow wheat in addition to their other crops.

21. Perhaps the greatest potential of the Southern Highlands lies in its mineral wealth, which until now has remained unexploited because of a lack of economical transportation. At this time the Illima Colliery in Rungwe, which supplies the nearby tea factory, is the only coal mine in the area. However, geologic exploration reveals an estimated reserve of 300 million tons of exploitable coal. Two-thirds of

this is located at the Ketewaka-Mchuchuma field, 100 miles south of the railroad, and several other fields in the area contain good quality coal. There are distinct possibilities for the export of coal both within Africa and overseas. Tanzanian coal could supply the refineries in Zambia's copperbelt, and inquiries have already been received from India and Japan about future exports.

22. A deposit of magnetite estimated at 78 million tons is located a few miles north of the Ketewaka-Mchuchuma coal-field at Liganga, and with the advent of the railroad the possibility of establishing an iron industry is being considered. Tests reveal a 49 percent iron content, 13 percent titanium dioxide, and a significant amount of vanadium. The difficulties of separating the titanium have been overcome by a Canadian-German process, and the high-priced vanadium, if extractable, would provide a valuable by-product. However, the Tanzanian Government feels that the development of an iron industry at Liganga depends upon the market potential for steel elsewhere in East Africa. Tanzania's needs in the foreseeable future are projected at only 30,000 tons per annum. However, if a steel industry is given preferential treatment within the East African Community, annual demand could be 100,000 tons.

23. Tanzania hopes the railroad will induce substantial population shifts. Experience with the Tanzania Central Railway between Dar es Salaam and Kigoma has shown this is likely. The anticipated economic growth and opening of new markets in both the Kilombero Valley and the Southern Highlands should create a large number and variety of employment opportunities. Indeed, market demand for food crops in the Ifakara area of the Kilombero Valley has already risen dramatically with the influx of railroad workers.

Local Costs and Chinese Goods

24. The terms of the \$400-million Chinese loan agreement are complex. It is apparently interest-free and repayable over a thirty-year period beginning in 1983, but other conditions are uncertain and some are known to have been changed since the original agreement was signed. Initially, Tanzania and Zambia agreed to import and resell Chinese-made goods to help raise funds to defray local costs. However, Tanzanian-Chinese transactions so far have not generated funds at the

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expected level, and the Chinese have had to provide hard-currency assistance to cover local costs.

25. The sale of Chinese goods in Tanzania is adversely affecting relations with Kenya at a time when any serious threats to the already shaky East African Community (EAC) could break it up. Chinese consumer goods have replaced Kenyan and other foreign goods in most Tanzanian stores, usually at a much higher price. However, the local populace has found their quality not up to par and sales have remained low. Tanzania has tried to re-export some of these goods to Western countries, including the United States, but has been largely unsuccessful.

26. Ironically, the Chinese have been purchasing large quantities of Japanese and Western-made goods in Tanzania. Except for the rail-laying equipment, Japanese and European hardware is being used in construction of the railroad. Also, one of the perquisites which each Chinese laborer receives is permission to buy a Western watch and transistor radio. By November 1972 more than 28,000 Omega watches had been imported into the country specifically for the Chinese workers although Chinese watches were being imported at the same time under the commodity agreement.

27. Zambians, observing the effects of using Chinese credits in Tanzania, are concerned about the potential impact on their economy. As of the beginning of this year, consideration was being given to making direct payments for meeting some of the local costs. Zambia is in a much better position to do this than Tanzania since her export earnings in the past have been far greater than Tanzania's.

Implications for Regional Cooperation

28. Zambia has been negotiating for membership in the East African Community (EAC) for some time, but little progress has been made. An efficient low-cost link with Tanzania could make this longstanding goal practical and provide increased opportunity for further East African cooperation. Trade between the two countries has already increased substantially and will probably continue to grow.

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29. However, there are several problems which must be faced before any major steps can be taken. One arises from the fact that in the era immediately following Rhodesia's independence Zambia embarked on long-term plans for self-sufficiency in agriculture and industry. Joining the EAC, whose members avoid duplication of efforts through the operation of common services, would obligate Zambia to bring her development policies in line with those of the Community. A second problem stems from the disparity in resources between Zambia and the three EAC countries. Although she has the smallest population of the four, Zambia exports more, has a far more favorable balance of trade, offers paid employment to more of her people, and has a higher gross national product than any of the members. A third problem involves the cost to Zambia of raising her tariffs, which are now lower than those of the EAC countries.

30. Joint operation of the Tan-Zam will eventually require a higher level of cooperation than presently exists between the two countries. Indeed, Zambia's leaders are uncomfortably aware of the fact that her landlocked situation places her in a vulnerable position even when it is another black African nation that lies between her and the sea.

Outlook

31. Barring any unforeseen difficulties, the Tan-Zam should be fully operational along its entire length sometime during 1975 and possibly earlier. The most difficult section through the Southern Highlands is completed and the route ahead through the rest of Tanzania and the relatively flat terrain of northern Zambia should present few construction problems. Congestion at the port of Dar es Salaam will prevent full use of the railroad unless ways can be found to increase its capacity or to divert goods to other ports in Tanzania and Kenya.

32. The railroad should prove to be an economic asset for both countries. For Zambia, freight rates on the Tan-Zam should be cheaper per ton-mile than they were on the meandering Rhodesian rail system to Beira, Mozambique, or the Benguela Railroad to Lobito, Angola. For Tanzania, the railroad will mean increased revenues from the transit of Zambian goods as well as cheaper transport for many of her

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own goods from the interior of the country. Additionally, development in previously remote areas of both countries could in the long run contribute considerably to growth of their economies. With repayment on the loan not scheduled to begin until 1983, the railroad could conceivably pay for itself. Perhaps most importantly, the Tan-Zam will greatly reduce Zambia's vulnerability to sanctions from southern Africa.

33. There is little likelihood that the PRC will be able to dominate either Tanzania or Zambia, but some degree of economic dependence on the PRC that could reduce the ability of these governments to collaborate with the West is possible. The Chinese are expected to remain in both countries for at least two years after the Tan-Zam is finished since neither country yet has the trained personnel needed to run the railroad.

34. The success of the railroad, however, will be somewhat dependent on a continuing amicable political climate between the two countries. A change in government in either, although highly unlikely at this time, could adversely affect their relationship and the joint operation of the Tan-Zam.



TANZANIA and ZAMBIA **Progress and Potential** **of the Tan-Zam Railroad** May 1973

Zam railroad
 railroad
 am highway
 of prospective development
 deposits (Q mine)
 outside copperbelt

